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Caritus, a New Genus of Caligoid Copepod, With a Key to the Genera of Caliginae

By Roger F. Cressey

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A small collection of copepods parasitic on *Chanos chanos* (Forskål), the milk fish, from Nosy Bé, Malagasy Republic, has brought to light a new genus of caligoid copepod described herein. The copepods were collected during the author's participation in the International Indian Ocean Expedition and he acknowledges the National Science Foundation-U.S. Program in Biology for supporting the field portion of this work. All material has been deposited in alcohol in the U.S. National Museum. All drawings were made with the aid of a camera lucida.

Caligidae: Caliginae

Caritus, new genus

First 3 thoracic segments fused with head. Fourth thoracic segment free. Lunules present. Dorsal plates absent. Postantennal process (maxillary hook) and sternal furca absent. First antenna 2-segmented. Second antenna with well-developed claw. Maxilliped with strong claw. Legs 1–3 biramose. Leg 1 exopod 2-segmented, endopod rudimentary, 1-segmented. Leg 2 with both rami 3-segmented. Leg 3 exopod 3-segmented, endopod 2-segmented. Leg 4 uniramose, exopod 3-segmented. Leg 5 present. Leg 6 present in male only. Genital segment

of typical caligoid form. Abdomen 1-segmented. Caudal rami conspicuous. Egg strings uniseriate.

Diagnosis applies to both sexes except where noted.

TYPE-SPECIES.—*Caritus serratus*, new species.

ETYMOLOGY.—From Latin, masc., "lacking, devoid of," alluding to lack of postantennal process and sternal furca.

Caritus serratus, new species

MATERIAL STUDIED.—4 females, 1 male from the gills of 2 specimens of *Chanos chanos* (Forskål) collected at Nosy Bé, Malagasy Republic, April 1964. Holotype female, USNM 120352. Allotype male, USNM 120353. Three paratype females, USNM 120354. One paratype female dissected for study.

FEMALE.—Body form as in figure 1. Total length and greatest width (measured at cephalon) of 3 undissected specimens 5.1 x 2.2 mm, 5.0 x 2.3 mm, and 4.3 x 1.9 mm. Cephalon comprising nearly one-half of body length, about as wide as long. Genital segment markedly triangular; narrowest anterior, widest posterior, about as long as wide (1.7 x 1.7 mm in 1 specimen). Abdomen 1-segmented (1.2 x .46 mm in 1 specimen); widest near middle, tapering only slightly to proximal and distal ends with slight constriction near distal end. Caudal rami (fig. 2) lamelliform; about 3 times as long as wide (420μ x 147μ in 1 specimen), bearing 6 short, naked setae arranged as in the figure.

First antenna (fig. 3) 2-segmented; first segment bearing numerous stout plumose setae along anterior margin, 2d segment bearing fewer naked setae near distal tip. Second antenna (fig. 4) 4-segmented; terminal segment in form of a stout claw, armed with 2 small setae as in figure. Mouth tube and mandible of usual caligoid form. Mandible with 12 teeth at tip. First maxilla (fig. 5) consisting of strong post-oral process and basal lobe bearing 3 naked setae. Second maxilla 2-segmented; tip of last segment as in figure 6. Maxilliped (fig. 7) in form of stout claw.

Legs 1–3 biramose. Leg 1 (fig. 8) with inner and outer short plumose setae on basipod; exopod 2-segmented armed as in figure, endopod 1-segmented with very small spine on inner distal corner. Inner 3 setae on last exopod segment plumose as in figure 9. Leg 2 (fig. 10) rami 3-segmented. Spines on outer distal corners of first 2 segments of exopod conspicuously toothed on inner margins, large distal spine on terminal segment with broad hyaline border. Leg 3 (fig. 11) coxo-basipod forming a broad lamella, rami small. Exopod 3-segmented without setae; spine on outer distal corner of first segment prominent, others reduced as in figure. Endopod 2-segmented; each segment

unarmed except for a fringe on outer border of each, ramus held along edge of basipod. Leg 4 (fig. 12) uniramose; exopod 3-segmented, each segment armed as in the figure, each segment with a fringe overlapping the bases of each spine. Spine and setal formula of legs 1–4 follows (Roman numerals refer to spines, Arabic to setae):

	leg 1		*leg 2*		*leg 3*		*leg 4*	
	exo	*end*	*exo*	*end*	*exo*	*end*	*exo*	*end*
seg 1	I:0	I	I:0	0:1	I:0	0	I:0	
seg 2	IV:3		I:I	0:2	I:I	0	I:0	
seg 3			III:5	6	IV		III	

All setae on legs 1–5 plumose. Leg 5 (fig. 13) a single free segment bearing 3 terminal setae, additional basal seta on inner lobe. Leg 6 absent. Egg strings uniseriate, long (2.9 mm in 1 specimen).

MALE.—Body form as in figure 14. Total length 4.6 mm. Greatest width 2.0 mm (all measurements based on 1 specimen). Cephalon as long as wide (2.0 x 2.0 mm). Genital segment rounded, somewhat longer than wide (1.1 x .9 mm). Abdomen about 3 times as long as wide (1.45 x .45 mm), widest in posterior half. Caudal rami (fig. 15) about twice as long as wide (478μ x 217μ) bearing 6 setae, inner and outer subterminal small and naked, terminal 4 stout and plumose, inner margins of rami with row of short hairs.

Cephalic and thoracic appendages as in female with following exceptions: Leg 2 exopod terminal segment proximal spine toothed (naked in female). Leg 3 exopod (fig. 16) with 7 spines on terminal segment (4 in female), inner distal corner of second segment with short pulmose seta (short spine in female). Leg 5 (fig. 18) represented by 4 plumose setae located at lateral sclerotized notch near mid-edge of genital segment. Leg 6 (see fig. 18) represented by 2 naked setae at outer distal corner of genital segment. Spermatophores rounded, visible within genital segment.

ETYMOLOGY.—From Latin, masc., "serrated," alluding to the toothed nature of the exopod spines of leg 2.

The Genera of Caliginae

The genus *Caritus* can be separated from all genera of the Caliginae except *Echetus*, *Alicaligus*, *Scianophilus*, and *Abasia* by the absence of both the postantennal process (maxillary hook) and sternal furca. It can be separated from these 4 genera because they all have a fourth leg exopod of only 2 segments (*Caritus* has 3). Not enough information was available to the present author to make a thorough comparison with *Caligopsis* Markewitsch but, according to the generic diagnosis given by Yamaguti (1963), the fourth legs are absent in *Caligopsis* (thus distinguishing *Caritus* from it).

Pillai (1962) erected a new genus *Pseudopetalus* to accommodate *P. formicoides* and *P. caudatus*, which he showed to be generically different from other species of *Parapetalus*, the genus to which they formerly belonged. He also proposed a new genus, *Parechetus*, to include *P. carangis*, formerly assigned to the genus *Caligodes*. Further, in 1963, in considering the genus *Abesia*, he showed that members of this group possess lunules, thus conforming to the requirements for inclusion in the subfamily Caliginae. Ho (1966) points out Yamaguti's error in erecting a new subfamily for *Echetus* since the genus does possess frontal lunules and therefore should be assigned to the Caliginae. These recent works, plus the new genus described herein, bring the total number of genera in this subfamily to 13. Since Yamaguti's key to the genera of Caliginae includes only 8 genera, his key is now inadequate and a new key is provided below to include the 5 additional genera.

Key to Genera of Caliginae Females

1. Sternal furca present 2
   Sternal furca absent 9
2. Postantennal process (maxillary hook) absent 3
   Postantennal process present 4
3. Fourth leg exopod 2-segmented, leg 1 with rudimentary endopod. **Caligodes**
   Fourth leg exopod 3-segmented, leg 1 endopod absent . . . . . **Parechetus**
4. Leg 4 rudimentary or absent 5
   Leg 4 normal 6
5. Leg 4 absent . . . . . **Caligopsis**
   Leg 4 consisting of small knob with 2 or 3 setae . . . . . **Pseudocaligus**
6. Body form typical caligoid form with no elongations or prominent winglike processes . . . . . **Caligus**
   Body form elongate or with conspicuous winglike processes 7
7. Leg 4 exopod 2-segmented . . . . . **Pseudopetalus**
   Leg 4 exopod 3-segmented 8
8. Genital segment produced posteriorly to form 4 digitiform processes. **Synestius**
   Genital segment and abdomen with prominent lateral expansions. **Parapetalus**
9. Leg 4 exopod 3-segmented . . . . . **Caritus**
   Leg 4 exopod 2-segmented 10
10. Leg 1 endopod 2-segmented . . . . . **Sciaenophilus**
    Leg 1 endopod 1-segmented 11
11. Leg 3 exopod 2-segmented . . . . . **Alicaligus**
    Leg 3 exopod 3-segmented 12
12. Cephalic region separated from genital segment by long neck . . . **Echetus**
    Body of more usual caligoid form, rostral area distinct . . . . . **Abasia**

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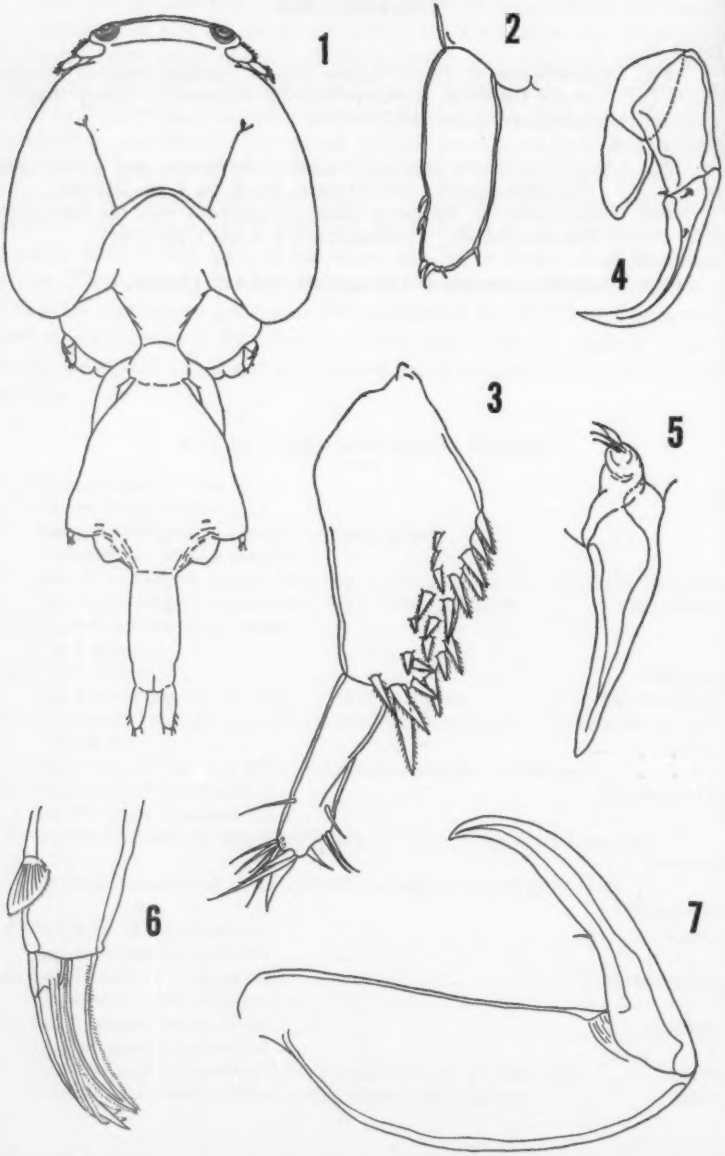
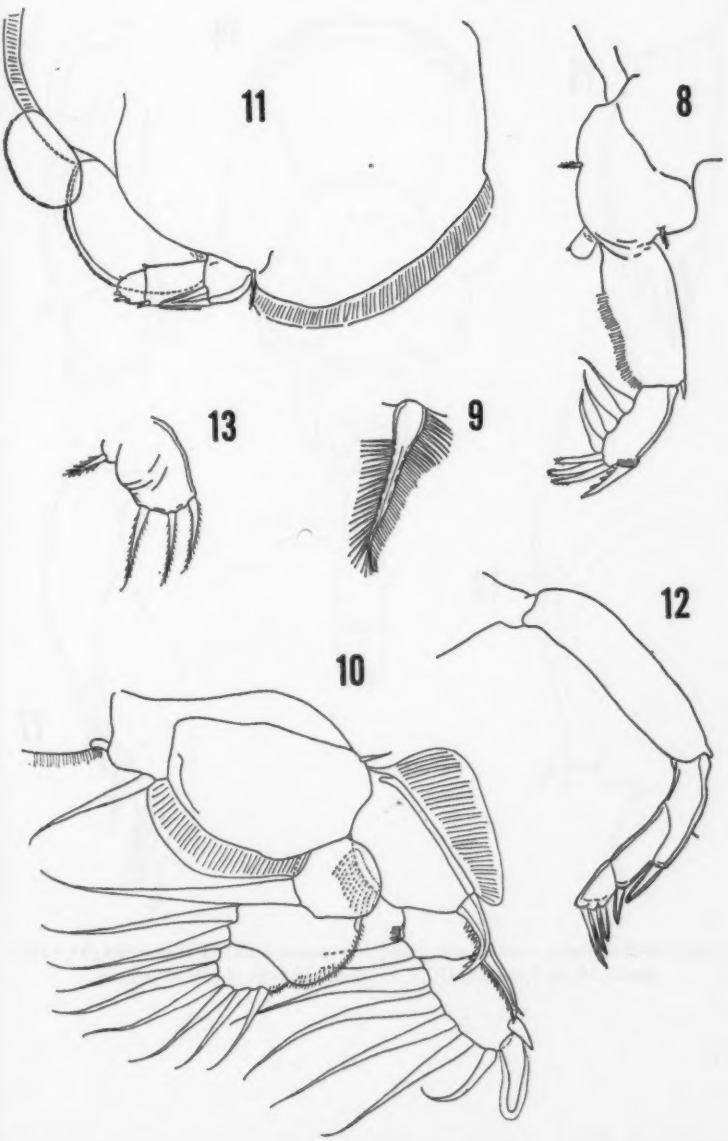
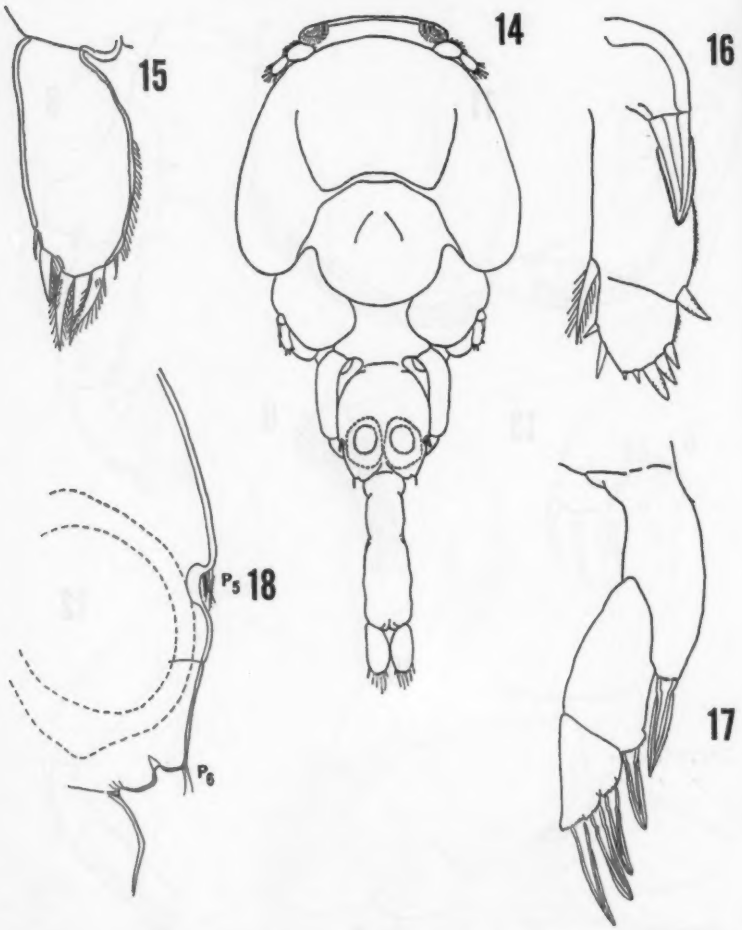
1963. Parasitic Copepoda and Branchiura of fishes, 1104 pp.



FIGURES 1–7.—*Caritus serratus*, new genus, new species, female: 1, dorsal view; 2, caudal ramus; 3, first antenna; 4, second antenna; 5, first maxilla; 6, tip of second maxilla; 7, maxilliped.



FIGURES 8–13.—*Caritus serratus*, new genus, new species, female: 8, leg 1; 9, inner seta on leg 1; 10, leg 2; 11, leg 3; 12, leg 4; 13, leg 5.



FIGURES 14–18.—*Caritus serratus*, new genus, new species, male: 14, dorsal view; 15, caudal ramus; 16, leg 3 exopod; 17, leg 4 exopod; 18, edge of genital segment.

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5, caudal